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ABSTRACT

The Applied Biological and Agribusiness Interest Inventory was revised to reflect seven agricultural career clusters and to measure agricultural interest of eighth-grade students. A study conducted in Pennsylvania tested the interests of 8th-grade students and then developed scoring keys using 10th-grade students as the basis for the key. The design of the study included a criterion group (10th graders who had completed at least 1 year of agricultural education and those who had not) and a norm group (8th graders electing to enroll in agricultural education and those who had not). Data were collected on students' agricultural background, gender, parents' background, and future educational plans. Following a pilot test of the instrument, it was administered to 618 8th graders and 195 10th graders. The resulting scores predicted future educational success. The instrument differentiated between students who have and do not have an interest in agriculture. The null hypothesis--that there was no significant difference between the responses of the criterion group and the norm group on each of the 100 items of the revised inventory and that those 10th graders judged successful by agriculture teachers will more positively correlate with the upper half of the 8th-grade scores than they do with the lower half--was rejected. The interest inventory could be used as one part of the career development process to guide students in career selection. (Nine tables and 27 references are included. An appendix contains the revised inventory.) (NLA)

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FINAL REPORT

# REVISION OF THE APPLIED BIOLOGICAL AND AGRIBUSINESS INTEREST INVENTORY (83-0006)

Mary Beth Bennett

THE PENNSYLVANIA STATE UNIVERSITY

UNIVERSITY PARK, PA

September 24, 1990

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# CHAPTER 1

## Introduction

United States agriculture is more than farming; it is a highly specialized, internationally industrialized, and productive food and fiber system with interdependent components. "The complexity of agriculture extends throughout the economy, making it increasingly vulnerable to political, social, and institutional forces (Wallace, 1986, p. v)." People in general are not aware of the interrelationships that exist.

> The farm and food system is one of the larger sectors in the U.S. economy. Centered on farming, it reaches backward through a chain of farm supply stores, banks, tractor dealers, and fertilizer distributors to manufacturing plants and industry-servicing facilities. Extending forward are all the activities that move raw food and fiber from the farm to the dinner table, restaurant, or clothier. On the food side, processing, transportation, and distribution are major parts of the system that require inputs ranging from tin cans to paper bags. On the fiber side are all the activities that link the cotton boll or sheep's fleece to the fabric or clothing consumers buy.
>
> Many people define and measure the farm and food system in relation to the activities of U.S. farms. However, in order to put food on the table and clothes on our backs, the system requires more nonfarmers than farmers. Farmers and hired farm workers are only 13% of the total work force in the entire system, and farming contributes only 11% of the end value of food and fiber products.(Wallace, 1986, p. 1).

Since the early 1800s, the farm and food system has been continually industrializing. In 1810, 84 percent of the labor force was in agriculture, and these workers produced about 72 percent of the gross national product (Wallace, 1986). Today, only 2 percent of the labor force is in agriculture and produce approximately 16.5 percent of the gross national product (United States Department of Commerce Bureau of the Census, 1988).

What has changed most from the frontier society to today's highly specialized, industrialized system, according to Wallace, is the time and effort spent in performing the basic functions and the degree to which all of us rely on one another to obtain food.

> Although the technology of production and processing have changed, the basic functions continue: (1) inputs for farm production must be supplied; (2) crops and livestock are produced; (3) raw farm products are processed

> and preserved; (4) assembly, wholesaling, and distribution occur; (5) retailing of food products is provided; and (6) food is prepared for consumption (p.2).

Within the context of changes in an agricultural economy vocational agriculture in the 1980s saw a lot of changes. The name was changed from vocational agriculture to agricultural education, and educational goals were changed to reflect an educational reform movement with a greater incorporation of vocational and academic subjects. As a result of the reform movement, the number of credit hours required for graduation, specifically academic courses, was increased, reducing time available for vocational courses and co-curricular activities.

> Along with the educational reform movement came the economic hard times for the farmer. Publicity from the media on the plight of American farmers losing their homes and crops caused a negative image for the agriculture industry. As a result of these two forces, there was a steady decline in the enrollment of students in vocational agriculture (Gill, 1989).

This decline can also be attributed to a general decline in numbers of youth in school and high dropout rates. In part due to the decline in enrollment, some vocational agriculture programs have been eliminated and agricultural educators are looking for ways to strengthen existing programs and create new ones to meet the needs of the future. One member of the Committee on Agricultural Education in Secondary Schools, National Academy of Sciences stated that "changes in purpose, clientele served, curriculum, and policy for vocational agriculture must occur for agricultural education to be a viable element in the public schools of the future (Warmbrod, 1987)." This reflects the need stated by the committee for a broader definition of vocational agriculture because technological and structural changes in agricultural industries have enlarged the scope and number of careers.

> In the committee's view, vocational agriculture should give students the skills needed to enter and advance in careers such as farm production;agribusiness management and marketing; agricultural research and engineering; food science, processing, and retailing; banking; education; landscape architecture; urban planning; and other fields.

> Change within agriculture is an ongoing process that will affect agricultural business and institutions. They must adapt to continue serving agriculture. The institution of vocational agriculture is no exception (National Research Council, 1988a, p. 2-3).

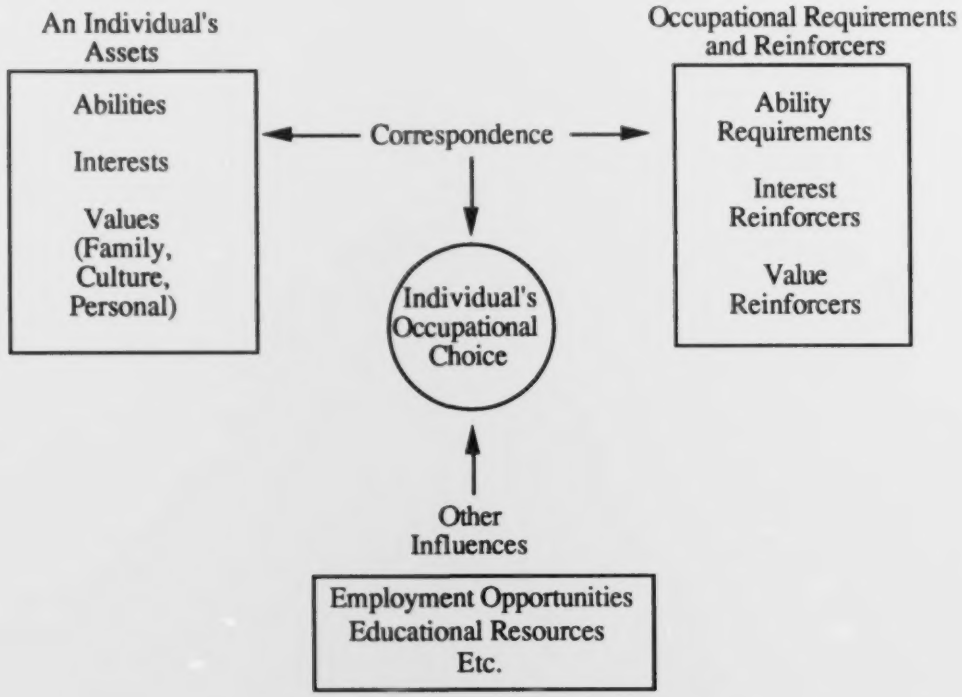
Vocational agriculture needs to make the adjustments necessary in order to educate students so that they are capable of making the correct occupational choice.

## The Nature of Occupational Choice

One of the most important decisions a person makes in his/her lifetime is the choice of an occupation. Ginzberg, Ginsberg, Axelrad and Herma (1951) stated, "occupational choice is a developmental process: it is not a single decision, but a series of decisions made over a period of years. Each step in the process has a meaningful relation to those which precede and follow it (p. 185)." The process of vocational development leading to an occupational choice is characterized by an individual studying himself/herself and occupational opportunities and attempting to arrive at a satisfactory compromise among interests, capacities, values, and opportunities (Super 1953). The vocational development process is thought by most people to begin during early childhood and to proceed through death (Krebs, 1972). Ginzberg et al. discussed vocational development through initial occupational choice resulting in employment or preparation for employment. They concluded that occupational choice is a developmental process which generally covers a period of six to ten years, beginning at around age 11 and ending shortly after age 17 or into young adulthood. There are three distinct periods or stages in the choice process -- fantasy, tentative, and realistic. They further distinguished several stages within the tentative and realistic periods, which they designated as follows: In the tentative period, covering roughly the ages from eleven to eighteen (the years during which young people move through junior and senior high school), they identified four stages--interests, capacity, value, and transition. In the realistic period (the years when a young person is in college, graduate school, or first begins to work), they designated three stages--exploration, crystallization, and specification.

Ginzberg et al. continue by noting that during the tentative period, they found young people steadily broadening their consideration of the elements underlying their emerging choice. At first, interest served as the major (often the sole) basis for their choice. But, with the passage of time, new elements intervene; the young person becomes aware that his/her interests are changing and new ones emerge. Equally, if not more, important, they begin to consider whether their capacities are congruent with their interest. They realize that they must consider their capacities in arriving at a choice.

The simultaneous consideration of an individual's assets and occupations and the nature of the compromises that result in an occupational choice as one proceeds through the periods proposed by Ginzberg et al. are depicted in the following adaptation of the model developed by Dawis and others (Krebs, 1972, p. 44).




**The Occupational Choice Process**

*Figure 1*

An individual has certain assets, such as occupational interests and abilities, as well as a set of values, which s/he has as a result of heredity and his/her environment. These assets vary from person to person and are the basis for individual differences. Occupations differ in providing opportunities to satisfy or reinforce individual interests and values and the abilities which are required to perform occupational tasks. As an individual progresses through the periods and stages proposed by Ginzberg et al., s/he is attempting to make decisions that will allow for a satisfactory correspondence between his/her perception of himself/herself and his/her perception of an occupation in light of other influences (Krebs, 1972).

Seligman (1980) reinforced this by stating:

> Generally, the higher an individual's intelligence, the higher his/her level of career aspiration, achievement and satisfaction. Similarly, the greater the relationship between an individual's abilities, interests, and aptitudes and the requirements of his/her job, the greater will be the job satisfaction and the better will be the job performance (Betz, 1971,; Campbell & Klein, 1975). However, these correlations are not high and gratification of personal needs seems to be at least as important in determining career satisfaction as is congruence between the nature of people's work and their interests and potentials (p. 28).

"Interest inventories are probably the most helpful sort of instrument to use in career counseling," according to Seligman (1980, p.100). She indicates that interest inventories are the least threatening type of test, they have the most relevance for career planning, and they can be readily understood and accepted by most clients.

The following are some of the goals which Seligman said can be accomplished by interest inventories:

1. Introduce unfamiliar careers
2. Increase knowledge of the world of work
3. Highlight discrepancies between interests and abilities and between interests and expressed career goals
4. Translate interests into occupational terms
5. Organize interests in meaningful and useful ways
6. Stimulate career thought and exploration
7. Provide insight into academic and occupational dissatisfaction
8. Broaden and increase the realism of options
9. Reassure clients who have made appropriate tentative career plans
10. Facilitate conflict-resolution and decision-making (pp. 100-101).

Interest inventory information has been used by school personnel and private industry personnel departments to assist individuals make better informed career decisions. There has been some skepticism regarding their use; however, interest inventories do provide one additional item of useful information for career decision making.

Zytowski (1974) conducted a longitudinal study of the administration of an early form of the Kuder General Interest Survey (Kuder, 1975) to a group of young people who averaged fourteen years of age at the time of the test administration in 1947. He found that 25 years after the administration of the inventory, 53 percent of the test-takers were in occupations which were consistent with their highest interest scores while 32 percent were in occupations which corresponded to their lowest interest score. However, those who were in occupations which were consistent with their high scores reported significantly greater job satisfaction than those whose occupations were not consistent with their high scores. Interests inventoried during early adolescence, then, do bear a relation to later career development and occupational satisfaction.

## Need for the Study

The Vocational Agriculture Interest Inventory for Guidance of Eighth Grade Students was developed in 1962 (Walker). The interest inventory was revised in 1971,(Walker and Stevens) renamed The Applied Biological and Agribusiness Interest Inventory, and has not been revised since that time. Moreover, there is an acute lack of alternatives.

Since the Vocational Agriculture Interest Inventory for Guidance of Eighth Grade Students was developed, substantial changes have occurred in both the agricultural sector and in formal school agricultural education programs. The technology of agricultural science has increased exponentially. Recently, the curriculum content of secondary school agriculture programs has changed with an increasing emphasis on agribusiness and science

related content. Currently, approximately 20 percent of all occupations are classified as agriculture related. However, only about 2 percent are directly related to production agriculture (Case, 1990). Yet, many students view agricultural education as being oriented toward production agriculture (Scanlon & Hoover, 1989).

During the 1970s, vocational agriculture and the Future Farmers of America (FFA) organization enjoyed their greatest popularity nationwide with approximately 697,500 students enrolled in vocational agriculture and 507,735 FFA members. Since then there has been a decline in the number of students enrolling in agricultural education programs 430,184 at all levels (National Research Council, 1988a, p. 27).

One suggestion for dealing with the declining enrollment in agricultural education is to change the image of agriculture. The image most people have of agriculture is related to farming. Coulter (1985) pointed out that the portrayal of agricultural via the mass media was not enhancing agriculture's image. The "farm problem" was all that was heard about when agriculture was the subject. An example she gave was The Washington Post which ran a series of front-page articles on farming titled "Growing Broke." The problems of the family farm were an important part of the day's agricultural scene but they represented only a part of the picture. Coulter stated "Through the years, as our standard of living has consistently advanced, we have been remiss in not publicizing agriculture's unique contributions to this miraculous achievement (p. 20)." This points to the fact that we need to change the agricultural image to a contemporary one rather than the traditional "farming" image. Agricultural education needs to show that it serves the total agricultural industry and that it is and exciting time to be involved in agriculture. Coulter implied that this could be accomplished by having our public relations efforts emphasize that scientific opportunities in agriculture are manifold. Agriculture plays an integral role in advancing the frontiers of science and technology related to areas such as: genetic engineering to improve livestock and crops; tissue culture to expedite plant variety development and propagation; to the development of more convenient, economical foods with nutrient

composition responsive to current research into diet and health relationships. Modern agriculture is inseparable from the world of insurance, credit, stocks and commodities, real estate , tax law, and monetary policy. Coulter best summarizes the importance of agriculture in the following statement.

> No other U.S. industry can compete with agriculture in terms of diversity of career opportunities, both at home and abroad. No other industry offers a broader nor more complex array of challenges associated with solving crucial domestic and world problems. Consequently, agricultural careers afford opportunities to interact with intellectually stimulating scientists and professionals, different cultures worldwide, dynamic organizations, and international leaders and political infrastructures -- whether one specializes in biological or physical science, in business or finance, or in social science areas of agriculture (p. 21).

Vocational agriculture no longer deals solely with production agriculture but encompasses the production, processing, distribution, and marketing of food, feed, and fiber and the management of our natural resources. As a result, there is an urgent need to develop a cadre of people who are capable of working in the different and emerging areas of agriculture.

A recent report indicated that agriculture will need college graduates in science, engineering and related areas, finance, marketing, merchandising, education, communications and social services (Coulter, Stanton and Goecker, 1986). In order to be able to provide students who are capable to work in those areas, there is a need for educators to help identify potential students who are interested in and qualify for those positions.

Scanlon, Yoder, Hoover and Johnson (1989) looked at factors affecting past and prospective enrollments in secondary school agricultural education programs and FFA membership. They concluded that the barriers to enrollment were much the same throughout the states represented in the study. Agriculture's farming (production) image and the perception of agricultural education were significant problems. Based on the findings of their study, they state that there appears to be a need to continue updating

agricultural programs and to create new recruitment and retention strategies to accompany those already identified as being successful (pp. 42-43).

Love and Yoder (1989) conducted an assessment of undergraduate education in American Colleges of Agriculture and looked at the perceptions of faculty, graduating seniors and other university students. Their study found that almost three fourths of the non-agriculture university students still think of agriculture as farming or ranching with 71% of the non-agricultural students rating Ag Careers as being lower in prestige than other careers. These figures make it apparent that many college students are unaware of the availability of large numbers of off-farm and off-ranch agricultural careers. Love & Yoder state that there is little doubt that this perception is having a negative impact on the recruitment, enrollment, and education of many who would pursue careers in agriculture if they understood the nature of the career opportunities (p.72).

An agriculture interest inventory will provide additional information to assist guidance counselors who provide guidance to students making their course selections. An agriculture interest inventory will also provide an opportunity to educate students about the vast array of interests and abilities required to work in the area of agriculture thus, expanding their knowledge in and about agriculture.

Research by and discussions with leading agricultural educators indicates that the development of an agricultural interest inventory that reflects current and future needs is urgent. A recent effort was made at Penn State through funding by the United States Department of Agriculture to convert the Applied Biological and Agriculture Interest Inventory to a computer program to facilitate its use (Reyburn, 1987). Reyburn developed a program that includes instant scoring at the end of a computerized questionnaire (Stratton, 1989) based on the Applied Biological and Agriculture Interest Inventory of 1971.

Because agriculture has changed so extensively since 1971 there is a need to revise the interest inventory to reflect the current areas encompassed by agriculture to make it

usable and effective in measuring agricultural interest of current eighth grade students, many of whom have no ties to agriculture through farming.

## Purpose of the Study

This primary purpose of this study was to revise the Applied Biological and Agribusiness Interest Inventory (Walker & Stevens, 1971) to reflect the current areas encompassed by agriculture and to make it usable and effective in measuring agricultural interest of eighth grade boys and girls. The resulting scores will be studied to determine if they can be used to predict students who will be successful in agricultural education. The end product will be the development of a test instrument that will be field tested and evaluated for its ability to differentiate between students who have an interest in agriculture and those who don't. This information will provide a database for further validation.

## Definition of Terms

The following terms are defined for use in this study.

Agriculture Interest Inventory: A psychologically grounded questionnaire that measures agriculture interests based on summarized findings about interests.

Agricultural Mechanics: Pertains to the principles of selection, operation, service, maintenance, repair, and safety in agricultural power (engines, electricity, and hydraulics) and the installation, service, adjustment, operation, and repair of farm machinery. Subject matter areas include agricultural structures and conveniences, soil management, water management, agricultural mechanics skills, agricultural construction and maintenance, and electrification (Newcomb, McCracken & Warmbrod. 1986.).

Agricultural Products, Processing and Marketing: Deals with the preparation of agricultural products for sale, such as meats, poultry, eggs, dairy products, fruits and vegetables, cereal grains and nonfood products (wool, cotton). Activities include assembling, sorting, testing, grading, inspecting, processing, storing, packaging, and marketing of agricultural products.

Agricultural Supplies/Services: Deals with the processing and selling of agricultural supplies, such as agricultural chemicals, livestock feeds, seed, fertilizer, petroleum, and other supplies including small equipment as well as servicing agricultural equipment. Knowledge and skills in purchasing, grading, storing, transportation, and marketing of agricultural products are used.

Expressed Interests: Expressions or professions of specific interest: preferences.

Forestry: Deals with the multiple use of forest lands and products, including their protection, harvesting, reproduction and management of wood products, watershed, wildlife, and recreation.

Horticulture: Deals with the production, sales and services in greenhouses, nurseries, and garden centers, and with the establishment of turf and landscape areas.

Emphasizes knowledge and skills important to establishing, maintaining and managing horticultural enterprises, including the machinery and equipment necessary to each enterprise.

Inventory or test: An organized pencil and paper or computerized instrument calling for student responses and producing a quantitative score.

Interest Inventory: Estimates of interests based on responses to a large number of questions concerning likes and dislikes, or concerning the order or preference for groups of activities.

Production Agriculture: Deals in the science of livestock, field crops, fruits and vegetables, fiber and other crops, on commercial and part-time farms and ranches. Involves the study of the economic use of agricultural land, labor, capital, and management, the safe and efficient operation of modern farm equipment, and the proper harvesting and handling of high quality agricultural products.

Renewable Natural Resources: Deals with the conservation and improvement of resources such as forested and other natural areas, fish and wildlife, soil, water, air, and land(range and arctic) and deals with establishment, management, and operation of recreational facilities.

# CHAPTER II

## REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK

The purpose of this chapter is to build a theoretical framework for vocational interests and the role they play in the career development process and to review and synthesize the most significant research and related literature concerning this effort. Topics to be review are: agricultural interests, student interests, interest inventories, interest inventory development, content validation of the interest inventory, construct validation of the interest inventory, and development of interest keys for interest inventories.

### Agricultural Interests

Agriculture today is very different from the agriculture that was prevalent during the 1930s. It is also different from the agriculture that was prevalent when Walker initially developed the Vocational Agriculture Interest Inventory for Guidance of Eighth Grade Students in 1962. When Walker conducted his study there were 250 schools in Pennsylvania with vocational agriculture as an elective, today that number is 194 schools with agriculture education as an elective. And, that number continues to decline as agriculture is perceived as being synonymous with farming. This is supported by Pope (1990),

> The American food and fiber system -- one of the greatest success stories known to man. The ability to produce food and materials for human usage is one which the average American has taken for granted. As long as food and fiber materials have been available, many have never questioned their origin. This attitude has proliferated through the years and when combined with a move from rural communities to more urbanized areas the real success story of American agriculture is lost. But beyond the fact that the knowledge about agriculture is important, of greater significance is the impact that agriculture has upon our daily lives socially, economically, and environmentally (p. 8).

During the 1970s vocational agriculture and the Future Farmers of America (FFA) organizations enjoyed their greatest popularity. Vocational Agriculture in the 1980's saw numerous changes. The name was changed from Vocational Agriculture to Agricultural

Education and educational goals were changed to reflect an educational reform movement toward the academic subjects. Along with the educational reform movement came the economic hard times for the farmer. Publicity from the media on the plight of American farmers losing everything caused a negative image for the agriculture industry.

The industry of agriculture now faces the greatest economic difficulty since the Great Depression. Many parents, failing to see any future in agriculture for their sons and daughters, are discouraging them from taking agriculture courses (Norris & Townsend, 1987).

Agriculture currently needs and will always need well educated, and highly motivated people to work in it's occupations. This is supported by the following:

> Agriculture is interwoven with many segments of American Life and the U.S. economy. Apart from sustaining human health and nutrition, agriculture in many ways supports commerce and trade, transportation, R&D, education, public service, private enterprise, community and family development, and outdoor recreation. For those reasons, agricultural sector prosperity will remain an important goal for national economic policy. All levels of government will still give attention to agriculture despite continued abundant production of high-quality, affordable food and fiber.
>
> U. S. industries that serve agriculture by producing, processing, marketing, and preparing food and fiber products for consumers account for about $450 billion in economic activity each year, which is about 20 percent of the gross national product. These industries provide food for 235 million Americans and export about 20 percent of the food on the international market. They also meet a variety of other needs. Agricultural industries supply materials for clothes, paper, medicines, oils, and thousands of other manufactured products. The labor force underlying this remarkable economic activity includes only 2.7 million farm workers, about 3 percent of the nation's labor force. But agribusinesses employ another 7 million workers, which is more than two for every full-time farmer. Retail and service industries that sell agriculturally related products employ 12 million more workers, mostly in restaurants and other commercial eating facilities (National Research Council, 1988b, pp. 13-14).

To insure that agriculture will regain its rightful place in society today and in the future there is a need to change it's image and make people aware of the impact agriculture has on their daily lives. Currently, this involves special interest groups who tend to be against agriculture. Another is through educating todays youth, making them aware of

agriculture's many opportunities. This is currently being done through the Agriculture Literacy movement with Agriculture in the Classroom. Another way is to change our agricultural education programs so that they are not only the traditional areas of agriculture production, mechanics, agribusiness and the FFA but also include horticulture, global agriculture, forestry and natural resources, as well as high technology.

One way for secondary agriculture departments to deal with declining enrollments is to make sure that the programs meet the needs of the students as well as the community, whether it be the local community or the world community. Another way is to work with students who have identified interest in agriculture.

Many people today think of agriculture as farming making them unaware of the many opportunities that are available for employment in the field of agriculture. This factor helps limit the number of students who elect to take agricultural education as a high school course. In Walker's (1962) study he stated that "supervisors, teacher educators, and teachers were in agreement that only students who possess a genuine interest in agriculture should be enrolled in vocational agriculture (p.10)."

## Student Interests

Walker stated that "The interests of students in agriculture seem to be the most common criterion used by teachers and counselors for selecting students who will enroll in agriculture (p.10)." Interests come from experience; they are learned (Kuder & Paulson, 1949).

During the childhood and early adolescent years, interests are in flux and may be greatly influenced by family and social background, peer group interests and educational and recreational activities and opportunities (Seligman, 1980). Interests seem to grow most in areas of greatest experience (Marr, 1965).

Boys' values have been found to differ from those of girls during the adolescent period. Powell and Bloom (1962) found that the most important occupational values of high school boys were (in order) financial reward, enjoyment of work and interest in work; girls' values were (in order) enjoyment of work, ability to perform the work and financial rewards. Whiteside (1976) found that adolescent boys admired competence most while girls admired virtue most. Stein (1972) found that the value systems of adolescent girls emphasized benevolence, support and variety while those of adolescent boys stressed recognition, independence and leadership. In general, girls seem to place more emphasis on intrinsic work values than do boys (Wijting, Arnold & Conrad, 1977). This also brings up the point that gender can influence career development.

Socioeconomic and ethnic background seem to influence value development during adolescence. Adolescents with professional fathers tended to value achievement, benevolence and leadership more than those whose fathers were not employed in professions (Stein, 1972). Whites have been found to stress enjoyment of their future work while blacks stressed friendly relations with their co-workers (Williamson, 1977).

There are many influences on adolescents' value development including parents, teachers, peers, culture and experience. As adolescents progress through high school, they are less influenced by their peers and become more able to formulate their own value systems. Interestingly, both boys and girls in the twelfth grade seem to have values which are more similar to those of their fathers than to those of their mothers (Wijting, Arnold & Conrad, 1978).

Seligman (1980) stated

> Although adolescents are aware of the need to make these [occupational] decisions long before the decisions must actually be implemented, the formulation of occupational choices during adolescence often seems to be a difficult process, one which is influenced by a wide variety of factors. Adolescents who are typically experiencing some confusion about their own identities may not find it easy to translate their self-images into occupational choices. Consequently, they may tend to procrastinate decision-making and leave themselves inadequate time for wide planning when decisions must finally be made (p. 205).

Overall level of adjustment has been found to be related to wisdom of occupational choice (Jersild, 1967). Adolescents who have fear of failure, low self-esteem, or poorly integrated sense of identity may have particular difficulty developing sound career plans (Galinsky & Fast, 1966).

Adams (1974) found that the circumstances of being educationally disadvantaged or not disadvantaged pervades students level of motivation, aspiration, expectation and career maturity. The type of educational program (career oriented and noncareer oriented), did not have a significant effect upon educationally disadvantaged students in terms of level of motivation and career maturity. The educational category to which larners[sic] belonged discriminated between educationally disadvantaged and not disadvantaged respondents on the Junior Index Motivation scale and on the Career Maturity measure (pp. 61-62).

Adams also stated that motivation of middle school age learners was significantly related to career maturity for learners involved in career oriented programs and for those not involved in career oriented programs. In addition, this relationship was significant for the disadvantaged and not disadvantaged learners.

Academic achievement and intelligence during adolescence have both been found to correlate positively with level of occupational aspiration and with later occupational success and satisfaction (Jordan & Super, 1974; Super, 1968).

Leband & Lentz (1985) observed that children follow in their parents' footsteps, very predictably, to a much higher degree in certain occupations than in others. Economic factors are at least partly responsible for observed differenced in rates of following across occupational classifications. It used to be common, if not expected, that a son would grow up and take over the family business or follow in his father's footsteps. Although less prevalent today, we still observe varying degrees of occupational following in business, politics, the arts, agriculture, and a host of other fields of endeavor.

The most pervasive theory of occupational following argues that transfers of physical capital across generations induce sons and daughters to follow in their parents' footsteps (Leband & Lentz, 1985, p. 8).

While parents may exert the strongest influence on occupational aspiration , there are a number of influential others in the adolescent's life. Day (1966) reported that forty-four percent of the high school students surveyed said that teachers had influenced their career plans. Boys were more influenced by their teachers than girls and the influence of teacher on an individual was found to be correlated with the amount of education required to reach that individual's occupational goal.

Experiences as well as people influence career development. Work experience and leisure activities, for example, have been found to influence adolescent career development and plans (Wircenski, 1972).

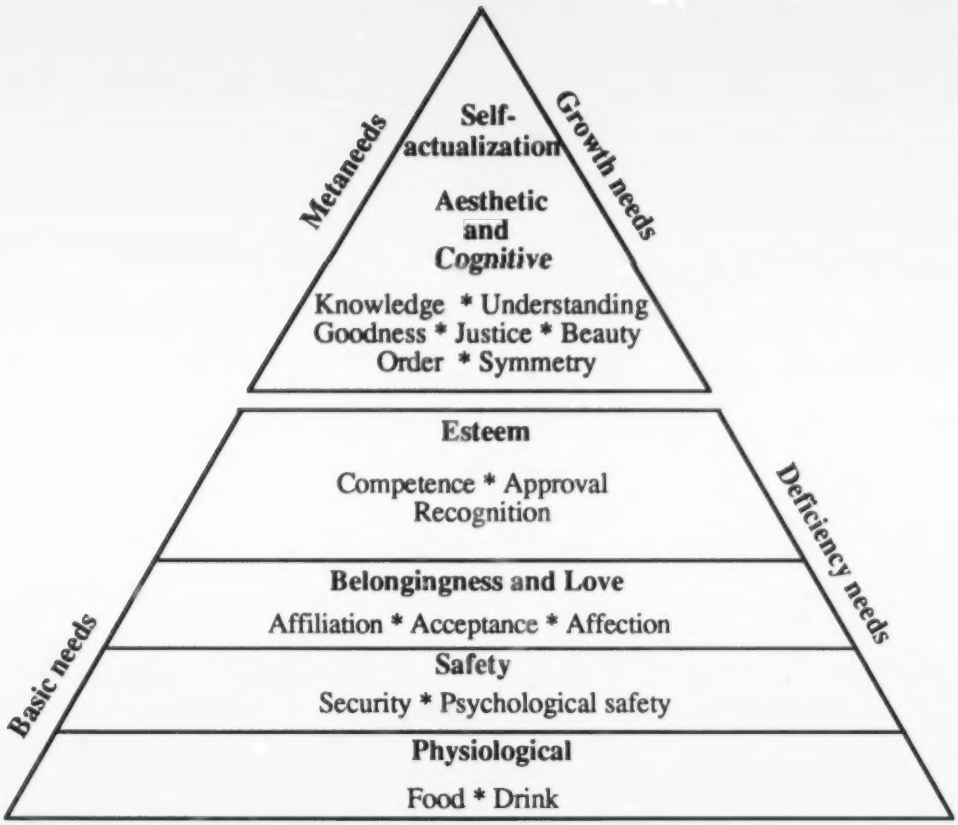
Interests are another determinant of occupation choice during adolescence. Williams (1973) found that adolescents' interest in the activities of an occupation was the best predictor of whether they would perceive the occupations as consistent with their own characteristics. However, correlations among expressed, manifest and inventoried interest during the adolescent years often modest, at best (Super, 1957a), and it may be difficult for the young person to determine which interest should be regarded as most important when making occupational choices. Interests have also been found to have been a less important determinant of occupational choice for vocational students then they were for college preparatory students (Shann, 1972) This may be due to the fact that vocational students often perceive themselves as having fewer options and more practical concerns than do college-bound young people.

Super & Crites (1962) said that "Interests are a product of interaction between inherited neural and endocrine factors, and opportunity and social evaluation on the other (p. 410)." Carter (1940) centered his work around the concept that choice of a vocation is a practical adjustment to the individual's environment. Darley (1941) proposed that

occupational interests were by-products of personality development which he later modified. However, all of these writers, including Super, point in various ways to the fact that the development of vocational interests is a part of the overall development of the individual which seems to crystallize, as Strong (1943) puts it, somewhere between the age of 15 and age 25, subject to natural changes and limitations as a function of aging.

This could lead to a section on development theories which would expand this chapter significantly. For the purposes of this paper the discussion will be limited to the humanistic approach to developmental theory. The humanistic approach concerns itself with the uniqueness of the individual and the belief that it is impossible to describe the environment in a truly meaningful way, much less a person, since the important features of the environment are particular to each individual (Lefrancois, 1987).

> Maslow was one of the individuals closely associated with the humanistic movement in psychology. He was primarily concerned with the development of the healthy personality. He believed that we are moved by two systems of needs. The basic needs are physiological (food, drink) and psychological (security, love, esteem). The metaneeds are described as higher-level needs. They manifest themselves in our desire to know, in our appreciation of truth and beauty, and in our tendencies toward growth and fulfillment (termed self-actualization) (see Figure 2 below). Alternatively, these two groups of needs are sometimes labeled growth needs (metaneeds) and deficiency needs (basic needs). The basic needs are termed deficiency needs because when they are not satisfied, individuals engage in behaviors designed to remedy this lack of satisfaction. The metaneeds are termed growth needs because activities that relate to them do not fulfill a lack, but lead toward growth. These needs are assumed to be hierarchically arranged in the sense that the metaneeds will not be attended to unless the basic needs are reasonably well satisfied. In other words, we pay attention to beauty, truth, and the development of our potential when we are no longer hungry and unloved (Lefrancois, 1987, p. 57-58).




**Maslow's Hierarchy of Needs**
*Figure 2*

One of the most succinct summaries of vocational interest measurement theory was written by Hahn and MacLean (1955). They state:

1. Interests are an aspect of personality development shaped by both hereditary and environmental factors.
2. Long-range, stable, occupational interests emerge during the early teens, but mature interest patterns are not fixed for most individuals until an age of approximately twenty-five years.
3. Interests are not necessarily closely related to aptitudes or abilities.
4. Interests probably cannot be created *de novo* and in a short time merely by the classroom presentation of varied and vicarious experiences to youth. Such exposure may possibly, however, start the development of a new zone of interest, help fix existing interests, or uncover latent ones.
5. A strong motivation toward certain types of occupational or avocational behavior is expressed by a wide number of responses to an extremely wide range of stimuli.

6. Interests, as aspects of personality and as employed by the general clinical counselor, involve both acceptance and rejection of possible lines of activity. For example, the typical worker with processes and things (mechanical interests) obtains interest scores which are negatively related to scores which measure a liking for persons and social situations.
7. The estimated, judged, or measured interests of secondary school and college students in an occupation seem to them to be and in fact often are quite unrelated to the training program they must take to prepare them for employment in the occupational family in which they have an identified dominant interest.
8. A legitimate interest in an occupational outlet often has little effect on grades earned in the curriculum leading to that outlet. Much of the training in a medical school may be largely quite unrelated to the particular aspects of medical practice toward which the interest is expressed.
9. Vocational and avocational interests appear to run in similar directions for a large proportion of individuals.
10. The interests of individuals tend to be less varied with increasing age (pp. 201-202).

Tyler (1964) said:

> For the practicing counselor, one of the most important generalizations to be drawn from several decades of research is that interest tests measure the *direction* rather than the *strength* of a person's interests. Because of the general meaning and connotation of the word "interest," a counselor who loses sight of this fact is likely to be puzzled by what looks like large discrepancies between interest and achievement (p. 186).

In the past counselors have used a variety of means of counseling students. These fall into the three broad areas of occupational information, appraisal, and decision making. Appraisal information consists of social, psychological, and interest data.

Super (1957) classified and defined interests into four types:

1. Expressed interests are expressions or professions of specific interest; they are preferences. Thus a boy may say that he is interested in stamp collecting or in engineering.
2. Manifest interests are expressed not in words, but in action, through participation in activities. Thus a high school girl manifests an interest in music by joining the glee club, by singing in the church choir, or by collecting classical records.
3. Inventoried interests are estimates of interests based on responses to a large number of questions concerning likes and dislikes, or concerning the order or preference for groups of activities. These responses are then summarized by statistical methods which yield a score for each of a number of occupations or types of occupational activity. Widely used

and rather well studied inventories include the Strong Vocational Interest Blank and the Kuder Preference Record.

4. Tested interests are manifest interests but interests manifested under controlled rather than life situations (pp. 218-219).

Craven (1961) in a summary review of the literature on interests concluded that expressed interests represent conscious efforts to integrate pressures and needs, hopes and aspirations, successes and failures. She further concluded that expressed interests are regarded as rather capricious...because they seem to be tied to transient and immediate influences and needs that are not central to the personality. Horrocks (1951) added to that by stating: "The most effective road to motivation and control of a person's behavior lies through the things that interest him (p. 379)."

Walker (1962) pointed out that since interests are very important in helping students select an occupational area the following question arises: Why not ask the student his[sic] occupational preference? Walker continued by stating that a number of studies have been conducted to determine the value of expressed interests in comparison with measured interests. He continued, teachers of agriculture have learned that some students do not express sincere interest in agriculture but are motivated to express a false interest in order to be enrolled in the same course as a friend. Boys who are interested in the field of agriculture will have expressed agricultural interests that will agree with tested agricultural interests; however, the main problem is to determine which boys have a genuine interest in agriculture.

## Interest Inventories

Interest Inventories have for a long time been associated with career counseling. Two of the most widely used are the Strong-Campbell Interest Inventory (SCII) originally developed by E. K. Strong (1938) and modified by D. P. Campbell (1974) and the Kuder interest inventories developed by G. F. Kuder (1963). More recently, Holland's (1973) approach to interest identification has received considerable attention. In most inventories,

interests are primarily designated by responses to compiled lists of occupations and lists of activities associated with occupations. The rational is that individuals having similar interest patterns to those found in an occupational group would more than likely find satisfaction in that particular group ( Zunker, 1986).

Gati (1987) stated that:

> Interest inventories are multifaceted: They are designed to identify the major interests of individuals in a small number of broad areas rather than in specific occupations. The result of many interest inventories is a score profile, in which each score represents the relative attractiveness or desirability of a particular cluster of activities or occupations. Interest inventories are not used, however, to assess an individual's interest per se but rather as one of the means of helping the individual in his her career development and career decision making (e.g., Gottfredson, 1986:Holland, 1985; Spokane, 1985). Specifically, the derived information regarding a person's interests is used as one of the guidelines for identifying a smaller subset of occupational alternatives for further exploration. Because such guidelines usually involve not only the identification of educational or occupational alternatives but also the elimination of others, the interpretation of the interest profile is crucial in the process of career decision making (p. 141).

Walker stated that interest tests can be used in the eighth grade to measure agricultural interests. He said that many students have had real participating experiences in the field of agriculture by the time they are in the eighth grade. Jordan (1953) noted that the lack of information about a specific work or vocation makes the measurement of that interest within the field or vocation questionable. Walker stated that this would not be the case when measuring agricultural interest because most interested students are acquainted, in general, with agriculture. This would not be the case today because many of the interested students are not acquainted with agriculture. There are currently more students from non farm backgrounds than there are from farm backgrounds.

Mursell (1947) stated "Persons in different educational curricula tend to exhibit characteristic and differential interest patterns (p. 255)." He further stated:

> A scale can be devised and standardized in such a way that it will not merely elicit whatever preferential interests a person may happen to have, but will show their relationship to the characteristic interest pattern of this or that

> occupational or educational group. When this is properly done, the result is an instrument of very considerable value for guidance and appraisal. Once we recognize that an individual's established interest pattern is related to the patterns of his own abilities, and furthermore that successful persons in various functional groups exhibit characteristic interest patterns, it is manifest that we have the basis for highly significant interpretations and prognostications (p. 255).

Interest tests are needed that will assist teachers of agriculture and guidance counselors to determine eighth grade students who should enroll in agricultural education and, in addition, to predict eighth grade students who may be successful.

Spitzer and Levinson (1988) said:

> Interests have been found to exert a more important influence on occupational choice than do aptitudes (Scharf, 1970), and to be a major determinant of both occupational choice and college major (Scharf, 1970; Thomas, Morrill, & Miller, 1970). Whereas interests influence the degree of satisfaction one experiences in a job and are related to the length of time one spends on a job, aptitudes seem to influence level of performance on a job. Unfortunately, many individuals gravitate toward occupations that they like, but in which they will not necessarily perform well. Consequently, interests have not been consistently found to be a predictor of occupational success, but have been associated with levels of job satisfaction (p. 674).

On the other hand, Zytowski (1970) concluded that being in an occupation which is congruent with one's interests resulted in a higher level of satisfaction than did being in an occupation which was not congruent with one's interests, especially when the interests were measured concurrent with the involvement in the occupation. As might be expected, interests predict persistence in a field as well as satisfaction with that field (Super & Bohn, 1970).

Seligman (1980) stated that interest inventories are probably the most helpful sort of instrument to use in career counseling. They are the least threatening type of test, they have the most relevance for career planning, and they can be readily understood and accepted by most clients. She listed 10 goals which can be accomplished by interest inventories, they are as follows:

1. Introduce unfamiliar careers
2. Increase knowledge of the world of work

3. Highlight discrepancies between interests and abilities and between interests and expressed career goals
4. Translate interests into occupational terms
5. Organize interests in meaningful and useful ways
6. Stimulate career thought and exploration
7. Provide insight into academic and occupational dissatisfaction
8. Broaden and increase the realism of options
9. Reassure clients who have made appropriate tentative career plans
10. Facilitate conflict-resolution and decision-making (pp. 100-101).

Seligman cautions that inventoried interests should not be given more credence than expressed interests. She says that expressed interests have considerable validity and reliability and should be thoroughly explored. She says that clients may sometimes answer questions about their career-related interests from a position which is affected by limited self-awareness, a lack of career information, a stereotyped and biased view of the world of work and their future role there and aspirations which others have imposed on them. She further states that expressed interests can indicate a wish to be in a particular occupation and to acquire its prestige or its financial rewards without indicating genuine interest in the activities involved in the performance of the occupation.

It should be explained that interest, both expressed and inventoried, always consist of both likes and dislikes and the like should not be examined to the exclusion of the dislikes. One needs to explore whether students have an accurate view of the work performed in the occupation which interests them, the life style which is generally mandated by that occupation, and both the positive and negative aspects of that field.

Often students who have taken interest inventories receive high scores in occupations which, at least initially, seem to hold little interest for them. Counselors need to help students take a broad view of occupations in an effort to understand why their patterns of high and low scores correspond to what they believe to be true about themselves.

Seligman said that one of the most difficult aspects of interpreting interest inventories constructively is the problem of differentiating interest from ability. Although some students have interests and abilities which are congruent, that is frequently not the

case. Interest test data must be considered in conjunction with other data, especially information on the student's abilities. Although interest inventories have been designed for and are appropriate for almost any age, Super and Crites (1962) concluded that the older and brighter the clients, the less they are likely to learn from interest inventories.

Interest inventories, for the most part, assess intrinsic sources of satisfaction and indicate the likelihood that an individual will enjoy a particular type of work. However, extrinsic satisfactions such as working conditions, salary, and life style inherent in a particular job or occupation are also important.

## Interest Inventory Development

Garretson (1930) said that the following criteria should be considered in the construction of a questionnaire to investigate the preferences of ninth grade pupils. He stated:

1. The items concerning which the pupils are asked to express preferences should lie within their field of experience.
2. The questionnaire should sample their preference over a wide field.
3. The vocabulary used must be easily understood by the group for which it is intended.
4. Sufficient choice must be allowed in the responses to provide an adequate statement of attitude.
5. The responses must be of such a type as to permit objective scoring and evaluation.
6. All directions required for the administration of the questionnaire should be clearly stated as a part of the questionnaire.
7. The total time required for the administration of the questionnaire should not exceed forty-five minutes.

Garretson used members of a class at the College of William and Mary to assist in writing items for a questionnaire (interest test). The items were written within the field of experience of ninth grade boys. Provision was made for the expression of three attitudes - like, indifferent, and dislike (L I D) - toward each item written by Garretson. He used the word "preference" in place of the word "interest" because he considered it more exact.

Anastasi (1982) stated,

> The study of interests has probably received its strongest impetus from educational and career counseling. To a slightly lesser extent, the development of tests in this area was also stimulated by occupational selection and classification. From the viewpoint of both the worker and the employer, a consideration of the individual's interests is of practical significance. Achievement is a resultant of aptitude and interest. Although these two variables are positively correlated, a high level in one does not necessarily imply a superior status in the other (p.534).

The more recently developed and revised interest inventories, according to Anastasi, reflect certain changes in career counseling. One of the changes pertained to the increasing emphasis on self-exploration. More and more instruments provide opportunities for the individual to study the detailed test results and relate them to occupational information and other data about personal qualifications and experience.

The second and related change, according to Anatasi, concerns the goal of interest measurement. Today, there is more emphasis on expanding the career options open to the individual. As a result of this change the interest inventory, as well as comprehensive career orientation programs are being used to acquaint the individual with suitable occupations that he or she might not otherwise have considered.

The third change, according to Anatasi, is related to the expansion of career options. It is the concern about sex fairness of interest inventories. Anatasi says,

> In general, interest inventories compare an individual's expressed interests with those typical of persons engaged in different occupations. This is done either in the scoring of individual item responses, or in the interpretation of scores in broad interest areas, or both. While this approach certainly represents an objective, empirical procedure for evaluating one's interest, it tends to perpetuate existing group differences among occupations (pp. 535-536).

Diamond (1975) under sponsorship of the National Institute of Education (NIE) compiled a number of articles concerning gender bias and unfairness in career-interest measurement. The NIE publishes guidelines that identify gender bias as "any factor that might influence a person to limit--or might cause others to limit--his or her consideration of a career solely on the basis of gender" (Diamond, 1975, p. xxiii). The guidelines are aimed

at encouraging both sexes to consider all career and educational opportunities and at eliminating sex-role stereo-typing by those using interest-inventory results in the career-counseling process.

Strong and Hansen ( 1981) stated, "Men and women, on the average, report somewhat different interests; no one who works closely with the results from interest inventories can avoid coming to that conclusion (p. 72)." The response differences between the Men- and Women-in-General samples were 16 percent or larger on 149 of the items. They also say that "Differences between the sexes in vocational interests appear early; in fact, they overwhelm all other considerations in the vocational musing of grade-school children (p. 72)."

Although male-female differences were obvious when general male groups were compared with general female groups, the differences persisted when men and women in the same occupation were compared. Strong and Hansen (1981) indicated that the differences in interests between men and women are relatively constant across all occupations in all of the Holland-code areas; no occupation is free of them, nor does any occupation studied have any novel pattern of differences that does not appear in other occupations. As a result of these differences, according to Strong and Hansen, sex cannot (or should not) be ignored in norming interest inventories. No matter how samples are selected, men and women respond differently to some items. To ignore this fact would be to introduce unnecessary error variance.

The Ohio Vocational Interest Survey used the Dictionary of Occupational Titles (DOT) 114 Worker-Trait Groups and plotted them into the cubistic model, they formed 24 homogeneous clusters. The descriptions of occupations within each cluster allowed sets of items to be constructed that constituted interest scales. Over a period of 3 years, and five developmental stages the instrument was developed and administered to large samples of high school students. As a result 280 items were selected for standardization from the original 450 items.

Content Validation of the Interest Inventory

According to Anastasi (1982) content validation involves the systematic examination of the test content to determine whether it covers a representative sample of the behavior domain to be measured (p. 131). She further states that content validity is built into a test from the outset through the choice of appropriate items (p. 132).

The content validity of OVIS II is a matter of how well it represents the world of work. Two questions were involved: (1) How representative is the sample of occupations on which the work activity items are based? and (2) How representative are the work activities themselves? The sample of occupations was drawn from a pool of 2700 high employment opportunities, representing over 90 percent of the work force. The pool was further refined to eliminate occupations with data-people-things levels inconsistent with the levels of their assigned clusters. From this reduced pool, 20 to 30 work activity statements were written (or selected from the OVIS I items) for each of the 23 scales. The work activity statements were taken directly from occupational descriptions in the DOT. After careful review for sex balance, previous statistical performance, and content coverage, the pool was reduced to 368 items for tryout in the research edition. Teachers and counselors were asked to fill out evaluation reports on the research edition of OVIS II, 80 percent were of the opinion that the items represented reasonable coverage of the world of work; 8 percent thought the coverage was not representative; and 12 percent did not respond.

The Strong-Campbell Interest Inventory resulted from constructing scales that pulled together related items focused on one content area. Responses to these items provided direct information about the person's feelings toward a specific activity, thus providing content validity.

Construct Validation of the Interest Inventory

Construct validity has to do with the appropriateness of an instrument as a measure of a construct, in this case the construct of vocational interests. Anastasi states that the construct validity of a test is the extent to which the test may be said to measure a theoretical construct or trait and that it requires the gradual accumulation of information from a variety of sources (p. 144).

OVIS II defines the domain of vocational interests as a set of 23 occupational clusters, represented by 23 scales, with 252 items used to assess interest in those scales. The construct validity of OVIS II rests on the ability of the items to provide a valid measure of the scales and on the ability of the scales to provide an accurate measure of the overall construct.

Item performance and scale homogeneity were assessed according to the standards prescribed for the development of OVIS I: (1) An item should correlate .50 or above with its own scale, (2) An item should correlate higher with its own scale than with any other scale, and (3) An item should not correlate .60 or above with more than three scales other then its own. Analysis of data from a 25% sample of the standardized group for grades 7 through 12 revealed that 240 of the 253 items, or 95%, satisfied all three criteria.

While item-scale correlations indicate the strength of the relationship between each item and its assigned scale, internal consistency reliability coefficients indicate the strength of the relationships between the items themselves. Internal consistency reliability coefficients were computed by means of Cronbach's coefficient alpha procedure for a 25 percent sample of the standardization group for grades 7 through 12 and for the entire college sample. All of the reliability coefficients were .83 or higher, with median coefficients between .88 and .90, indicating the highly homogeneous nature of the items making up each scale.

Although each item was selected to correlate highest with its own scale, it was reasonable to expect that certain items would correlate highly with closely related scales. Closely related scales were expected to cluster--that is, to have fairly high inter-scale correlations. However, it was desirable that all other scale be relatively independent. As a part of scale independence review, three characteristics were examined: (1) the total number of scale intercorrelations above .70, (2) the degree to which any one scale correlated above .70 with the other scales, and (3) the relationship between the scale intercorrelations and the reliability coefficients.

## Development of Interest Keys for Interest Inventories

Walker said that the purpose of a key is to separate from a general norm group a criterion group. This separation is possible because interest patterns differ for different groups. Students of a criterion group respond in a different way than the norm group to certain item answer positions on the interest inventory; and, for those item answer positions that are tested and determined to be significantly different, a key is developed. Then this key is applied to test answer sheets, all students who respond to item answer positions as did the criterion group receive higher scores( P. 20).

Kuder stated

> The best reference group for any specific situation is ordinarily the group from which subjects are to be distinguished. it is recommended that users develop their own appropriate reference group when possible (p. 9).

Approximately 200 cases are needed for the criterion group; however a more homogeneous group may require the use of fewer cases in order to develop a useful key. Kuder used 1,000 cases to develop the norm for adults.

The construction of a key for a five point answer scale follows the same procedure used in developing the Kuder Key up to a given point. This similarity of development ends

with determining the significance between proportions to answer positions for each item. At this point a change is necessary, based on the procedure used in answering each statement. A student reacts to answer positions on a line scale that ascertains the student's degree of "like" or "dislike" for a statement. For item answer positions showing proportions for the criterion group and the norm group that are significantly different, the following procedure is used in punching the scoring keys:

1. A hole is punched in the positive scoring key when a greater proportion of the criterion group respond to a given item position.

2. A hole is punched in the negative scoring key when a lesser proportion of the criterion group respond to a given item position. The score obtained for each student results by subtracting the negative score from the positive score. An appropriate sum may be added to all scores so that all will be positive numbers.

## Summary

After reviewing the literature, it becomes obvious that numerous studies have been conducted for the purpose of identifying interests with regard to career development . Studies have shown that during childhood and early adolescence, interests are in flux and that they can be influenced by factors such as family, social background, peers, and others. One theory (Leband & Lentz, 1985) stated that children follow in their parents' footsteps very predictably in certain occupations and that economic factors were at least partly responsible for the differences in rates of following across occupational classifications.

Another theory is that the development of vocational interests is a part of the overall development of the individual that occurs in stages. This theory would include the previous theory of parental influence in one of the development stages of the individual.

The literature review reveals that student interests play an important part in the career development process and that student interests are valid to test for as long as they are

not used exclusively, but in conjunction with expressed interests and abilities. This is evident by the numerous interest inventories currently in use such as: the Strong-Campbell Interest Inventory, the Kuder Occupational Interest Survey, COPS Interest Inventory, the Ohio Vocational Interest Survey (OVIS), and the Minnesota Vocational Interest Inventory to name a few.

Vocational interests are established at an early age as a result of a number of factors, however they vary from individual to individual. These interests are considered to be important components in the career development process. Interests are assessed through interest inventories which compare the individual's expressed interests with those typical of persons engaged in different occupations.

Since the interests of students in agriculture seem to be the most common criterion used by teachers and counselors for selecting students who will enroll in agriculture it is of utmost importance to have an instrument that can accurately assess those interests.

# CHAPTER III

# PROCEDURES

## Purpose of the Study

This purpose of this study was to revise the Applied Biological and Agribusiness Interest Inventory (Walker & Stevens, 1971) to reflect the current areas encompassed by agriculture and to make it usable and effective in measuring agricultural interest of eighth grade boys and girls. Inventory scores were analyzed to determine prediction reliability of students who will be successful in agricultural education. The end product is a field tested interest inventory, evaluated for its ability to differentiate among students who have an interest in agriculture and those who do not. This information provides a database for further validation.

## Hypotheses to be Tested

The hypothesis was stated as a null hypothesis to apply the proper statistical treatments to the data. A null hypothesis was used to test differences in the responses of the criterion and norm groups to items in the inventory developed in this study. It was stated as follows:

There is no significant difference between the responses of the criterion group (10th grade) and the norm group (8th grade) on each of the 100 items of the revised Biological and Agri-science Inventory and that those 10th graders judged successful by agriculture teachers will more positively correlate with the upper half of the eighth grade scores than they do with the lower half. Conversely, those 10th graders in the lower half will correlate higher with the 8th graders in the lower half than they will with 8th graders in the upper half.

## Design and Scope of the Study

The study was conducted using descriptive survey research design procedures. Purposive sampling was used to insure geographic and demographic representation of students within Pennsylvania. This study was conducted with eighth grade and tenth grade students in school districts where four years of agricultural education is offered at the secondary level. The schools were located in south-east Pennsylvania. The study was concerned primarily with the testing of interests of eighth grade students and the development of scoring keys using tenth grade students as the basis for the key.

Tenth grade students were rated successful in agriculture if they have completed at least one year of agricultural education and planned to continue in the program the following year. Agricultural teachers were asked to rank each tenth grade student according to criteria in order to further differentiate successful students from less successful students.

The design of the study provided that eighth grade students be rated against tenth grade students in order to develop keys that would differentiate from all eighth grade students, those who possessed interests similar to those of successful tenth grade agricultural education students. A modified criterion-group research schematic is provided below to clarify the research that was conducted.

| | | |
|---|---|---|
| Criterion Group | C1 | Successful 10th grade students |
| | C2 | Non successful 10th grade students |
| Norm Group | N1 | 8th grade students electing to enroll |
| | N2 | 8th grade students electing not to enroll |

Figure 3: Criterion- Group Research Schematic

| | | | |
|---|---|---|---|
| High | C1 Criterion Reference Group (10th Grade) | High | N1 Norm Reference Group (8th Grade) |
| Medium | C1 Criterion Reference Group (10th Grade) | Medium | N2 Norm Reference Group (8th Grade) |
| Low | C1 Criterion Reference Group (10th Grade) | Low | N3 Norm Reference Group (8th Grade) |
| High | C2 Criterion Reference Group (10th Grade) | Low | N3 Norm Reference Group (8th Grade) |
| Medium | C2 Criterion Reference Group (10th Grade) | Medium | N2 Norm Reference Group (8th Grade) |
| Low | C2 Criterion Reference Group (10th Grade) | High | N1 Norm Reference Group (8th Grade) |

Figure 4: Illustration of Comparisons Conducted for Subgroups of the Norm and Criterion Groups

This descriptive study utilized a correlational technique to generate a list of statements to identify the agricultural interests of eighth grade students. Cronbach's alpha was used to assess instrument reliability of the instrument.

## Objectives of the Study

The following objectives were identified as pertinent to the study:

1. To identify test items that represent the seven agricultural career clusters (1. production agriculture, 2. agricultural mechanics, 3. horticulture, 4. agricultural products, processing and marketing, 5. agricultural supplies/services, 6. renewable natural resources, and 7. forestry).

2. To complete validity and reliability assessments of the interest inventory.

   Specifically, the assessments to be completed include:

   a. content and face validity;
   b. discriminating ability;
   c. differentiation into career clusters;
   d. internal consistency using Cronbach's Alpha.

3. To develop a valid scoring key that differentiates between high and low interests based on the responses of the successful tenth grade students.

## Research Questions

This study addressed the following research questions in addition to the hypotheses:

Question One: What are the background characteristics of successful 10th grade agricultural students and less successful 10th grade ag. students with regard to :

1. agricultural background
2. gender
3. parents background
4. student's future educational plans

Question two: What are the background characteristics of eighth grade students with regard to:

1. agricultural background
2. gender
3. parents background
4. student's future educational plans

## Assumptions of the Study

The study was based on the assumptions that (1) an instrument needs to be developed that accurately reflects interests associated with contemporary agriculture, (2) there is a need for the development of an updated instrument, (3) students with experience

in agricultural education will provide an appropriate gauge by which to measure student interest in agriculture.

## Instrumentation

The following section describes procedures related to the development of the instrument which occurred in two stages.

### Stage I. Construction of the Revised Applied Biological and Agribusiness Interest Inventory and Pilot Test

The revised Applied Biological and Agri-science Inventory interest items were patterned after agricultural items in the Pennsylvania Vocational Agriculture Interest Inventory ( Walker, 1962). Each item relates to one of the seven agricultural career clusters (1. production agriculture, 2. agricultural mechanics, 3. horticulture, 4. agricultural products, processing and marketing, 5. agricultural supplies/services, 6. renewable natural resources, and 7. forestry). After the items were written by experts from the seven agricultural cluster areas, they were given to faculty and staff members in the College of Agriculture, The Pennsylvania State University, for advice and criticism. This provided content validity from the outset through the choice of appropriate items which will be used to measure student responses towards a specific item relating to agriculture. Graduate students in agricultural and extension education assisted in item selection as well as a secondary agricultural education teacher on sabbatical. An inventory of 140 questions was developed as a result of this input. The Behavioral and Social Sciences Committee of the Institutional Review Board at the Pennsylvania State University reviewed and approved this proposal for use of human subjects in this research.

The inventory was evaluated in a pilot study at two separate schools. The schools used for the pilot study were Mifflinburg located in Union County with 160 eighth graders

and 30 tenth graders for a total of 190 students, and Chambersburg located in Franklin County with 282 eighth graders and 12 tenth graders for a total of 294 students. This resulted in a total of 484 students in the pilot study with almost an even number of male (220) and female (223) students being represented. The students reacted to the statements related to the seven areas mentioned earlier in the following manner: "strongly like", "like", "undecided", "dislike", and "strongly dislike". The pilot study resulted in the deletion of some statements, revision of others, and the addition of new statements in order to maintain a list of 100 statements. The statements were then put into a test booklet along with instructions for use. Responses from this pilot study were used to determine content validity of the instrument. The construct validity of the instrument rests on the ability of the items to provide a valid measure of the scales and the ability of the scales to provide an accurate measure of the overall construct.

Internal consistency reliability coefficients indicate the strength of the relationship between the items themselves. Internal consistency reliability coefficients were computed by means of Cronbach's coefficient alpha procedure using the entire pilot study sample. All of the reliability coefficients for the pilot study were .80 or higher, with an overall coefficient of .98 indicating the highly homogeneous nature of the items making up each scale.

Stage II A Purposive Sampling of Schools in Pennsylvania

The instrument was further tested in a preliminary study involving eighth grade and tenth grade students in ten school districts where four years of agricultural education is offered at the secondary level. The schools were located in south-eastern Pennsylvania are listed as follows:

| School Name | County |
|---|---|
| Newport | Perry |
| West Snyder | Snyder |
| Lower Dauphin | Dauphin |
| Waynesboro | Franklin |

| | |
|---|---|
| Huntingdon Area | Huntingdon |
| Big Spring | Cumberland |
| Manheim Central | Lancaster |
| Shippensburg | Cumberland |
| W. B. Saul | Philadelphia |
| Conrad Weiser | Berks |

A detailed description of the results is included in tables that follow Chapter 4.

## Measures of Success

In order to determine measures of success of eighth students who enroll in and pursue agricultural education this study used the tenth grade students currently enrolled in agricultural education as a criterion group with the teachers of agriculture specifying whether the tenth grade student had a "high" or "low" interest in agriculture based on several questions. The questions were as follows:

1. How does this student perform class work?
2. How does this student perform in the laboratory?
3. How does this student do on S.O. E. projects?
4. How does this student perform in the F.F.A.?
5. What is this student's overall rating in ag. ed. ?
6. Is this student an officer in the F.F.A. ?
7. If "yes" above, what office does the student hold?
8. Would you recommend this student continue in the agricultural education program next year?
9. Would you recommend that this student look into education beyond high school?
10. If you answered yes to Item 9, which of the following options would you recommend?
    - A. College or University
    - B. Junior College
    - C. Trade School
    - D. On-the-job training - such as military or apprenticeship
    - E. Other

## Selection of the Sample Group

The population was eighth grade students in Pennsylvania public schools who have a secondary agriculture program. The schools selected were representative of urban and rural schools (a purposive sample was used). A second population of tenth grade students currently enrolled in agricultural education in the same school system will be used to help validate the instrument. (Research by Kuder revealed that the criterion group should number approximately 200 persons in order to develop a useful key for the Kuder Form D.)

## Preparation of Teachers and School Administrators

After the schools are selected, agriculture education teachers were contacted to see if they would participate. If so, they were asked to obtain permission from school administrators to conduct the study; a cover letter was sent to the administrator and agricultural education teacher. On the cover letters, it was indicated that the study presents no risk of harm to the students and involves no procedures for which written consent of the subjects is normally required outside of the research context. A copy of the procedures of this investigation and a description of the purposes of the study were provided and discussed. It was explained that any data or answers to questions would remain confidential with regard to individual students' identities. Individual students were not required to participate in this study if they did not desire to do so. (See Appendix ).

## Collection of Data

Data were collected from the students by using a computerized form on which the students used a #2 pencil to record their responses. Use of these forms allowed for a faster turn around because it does not require the services of a key punch operator to enter the

data. Once the form was completed it was entered onto a computer program by running the forms through the form reader.

## Statistical Analysis

Once the interest inventory was conducted, it was analyzed using the Statistical Package for the Social Sciences, Version 10 (SPSSx). When the information was entered into the computer system the following assessments were conducted:

a. content and face validity;
b. discriminating ability;
c. differentiation into career cluster;
d. internal consistency using Cronbach's Alpha.

The end product is an interest inventory that has been field tested and evaluated for its ability to differentiate between students who have an interest in agriculture and those who don't. Item-scale (career cluster) correlations and scale (career cluster) intercorrelations were computed. A factor analytic procedure was conducted to examine the loading of items into career cluster scales and identify statements for assignments to final clusters.

# CHAPTER IV

# PRESENTATION AND DISCUSSION OF DATA

## Introduction

The purpose of this study was to develop a revised Applied Biological and Agribusiness Interest Inventory and field test it in Pennsylvania to determine if there were differences between responses of the criterion group (10th grade) and the norm group (8th grade) on each of the 100 items on the interest inventory. A secondary purpose was to determine whether those 10th graders judged successful by agricultural teachers positively correlate with the upper half of the eighth grade scores than they do with the lower half.

## Characteristics of Students in the Preliminary Study

### Gender

Fifty-two percent of the students in the study were males with 48 percent females. The eighth grade students were 52 percent female and 48 percent male. The tenth grade students were 62 percent male with 38 percent being female.

### Status

Students in the study were predominantly eighth graders (76%). With a majority (48%) of the students being 14 year olds and white (84%).

### Residence

The majority of the students (63% of the 8th graders and 67% of the 10th graders) were from urban areas. A minority (7% of the 8th graders and 15% of the 10th graders)of the students live on farms with 17 percent and 26 (respectively) percent living on a farm at some time. Twelve percent of the 8th grade and 87 percent of the 10th grade students were planning to enroll in agricultural education next year. Of those enrolling 13 percent and 39

percent respectively said others encouraged them to enroll. Teacher evaluations of tenth grade students revealed that they would recommend 98 percent of the students to continue in agricultural education next year.

Parents education and job status

A majority (49%) of the students father's had high school or equivalent education and (39%) were employed in other occupations than those listed. A majority (44%) of the student's mothers had high school or equivalent education.while 42 percent listed their job as other.

Future education

A majority (70%) of the students said that they wanted to go to college after high school while 79 percent said they had grades of B's and C's or better. Teacher evaluation of tenth grade students revealed that they would recommend a majority (77%) of their students look into education beyond high school with 43 percent of that being at the college or university level.

Activities outside school

A majority of the students stated that they had not been involved in scouts (57%) or 4-H (77%).

FFA involvement

A majority (74%) of tenth grade students were FFA members with 52 percent of them joining voluntarily and 75 percent stating that FFA was important as a part of agricultural education. Of those 47 percent had their Greenhand Degree while 24 percent had their Chapter Degree.

## Test of the Hypothesis

The means and standard deviation for successful tenth grade students, eighth grade students planning to enroll in agricultural education and eighth grade students not enrolling in agricultural education are reported in Table 1. Table 1 contains a summary of results for the seven different scales presented in the agricultural interest inventory.

The null hypothesis, that there was no significant difference between the responses of the criterion group (10th grade) and the norm group (8th grade) on each of the 100 items of the revised Biological and Agri-Science Inventory and that those 10th graders judged successful by agriculture teachers will more positively correlate with the upper half of the eighth grade scores than they do with the lower half, was rejected. Students in the criterion group scored significantly higher than students in the norm group in general, however, those students judged successful by their agriculture teacher positively correlate with those students planning to enroll in agricultural education next year. Using a t-Test, it is apparent that successful tenth grade students scored significantly higher than eighth graders not planning to enroll on all seven scales thus supporting the rejection of the null hypothesis. On a similar t-Test, it is apparent that successful tenth grade students scored similarly to those students planning to enroll next year, therefore supporting the correlation between both eighth and tenth grade students planning to enroll next year.

Means, Standard Deviation and Reliability Results for the Overall Instrument and Respective Subscales are presented in Table 2.

Comparison for Male and Female Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory are presented in Table 3.

Comparison for Rural and Urban Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory. are presented in Table 4.

Comparison for Enrolling and Non Enrolling Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory are presented in Table 5.

Comparison for Farm and Non Farm Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory are presented in Table 6.

Comparison for Future College Education and No Future College Education Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory are presented in Table 7.

Comparison for Academic Performance in Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory are presented in Table 8.

Comparison for Socio-Economic Status of Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory are presented in Table 9.

## Summary

The null hypothesis, that there was no significant difference between the responses of the criterion group (10th grade) and the norm group (8th grade) on each of the 100 items of the revised Biological and Agri-Science Inventory and that those 10th graders judged successful by agriculture teachers will more positively correlate with the upper half of the eighth grade scores than they do with the lower half, was rejected. Students in the criterion group scored significantly higher than students in the norm group in general, however, those students judged successful by their agriculture teacher positively correlate with those students planning to enroll in agricultural education next year.

## Conclusions and Implications

As stated previously in this study, this study was conducted to develop an interest inventory that would assist teachers of agriculture and guidance counselors to determine eighth grade students who should enroll in agricultural education and, in addition, to predict eighth grade students who may be successful in agriculture courses. Counselors need to help students interpret their interest inventory results in conjunction with their expressed interests and abilities. Since the interests of students in agriculture seem to be the most common criterion used by teachers and counselors for selecting students who will enroll in agriculture, it is of utmost importance to have an instrument that can accurately assess those interests.

Using the model in Figure 1 of Chapter 1 and the results of the interest inventory, guidance counselors can develop a framework to guide students in career selection. This will assist the student in designing a career development program resulting in increased career awareness. This increased career awareness is especially critical today when students are preparing for future occupations which may not currently exist. Additionally, these students in the the course of their lifetime will probably change careers, on an average, a total of seven times.

This study provides implications for better information on gender. It allows access to careers in agriculture regardless of stereotypical images. This study attempted to reduce sex bias and focus on careers regardless of gender through the wording of the statements. As a result of this study it is recommended that a special effort be made to have all races and sexes represented during recruitment efforts to further eliminate any gender biases which may exist.

Table 1 Means and Standard Deviations for Successful Tenth Grade Agricultural Students, Eighth Grade Students Planning to Enroll in Agriculture and Eighth Grade Students Not Enrolling in Agriculture Reported for Instrument Subscales

| Instrument Subscale | Successful Tenth Grade Ag. Students | | | Eighth Grade Students Enrolling in Ag. | | | Eighth Grade Students Not Enrolling in Ag. | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | X | S.D. | N | X | S.D. | N | X | S.D. |
| Production Agriculture | 140 | 87.1 | 14.5 | 63 | 88.6 | 18.4 | 466 | 69.8 | 18.3 |
| Agricultural Mechanics | 141 | 41.1 | 9.0 | 68 | 39.4 | 10.7 | 494 | 31.9 | 10.5 |
| Horticulture | 143 | 48.6 | 10.0 | 70 | 47.9 | 11.8 | 492 | 38.7 | 11.6 |
| Agricultural Products Processing & Marketing | 135 | 53.3 | 8.3 | 65 | 51.5 | 11.4 | 482 | 44.3 | 10.1 |
| Agricultural Supplies and Services | 142 | 47.3 | 7.5 | 66 | 45.7 | 11.1 | 496 | 41.9 | 9.0 |
| Renewable Natural Resources | 138 | 53.2 | 9.9 | 65 | 52.5 | 13.9 | 489 | 41.6 | 13.0 |
| Forestry | 143 | 24.2 | 4.7 | 68 | 24.3 | 5.4 | 506 | 19.0 | 5.8 |
| Total Instrument | | | | | | | | | |

Table 2 Means, Standard Deviations and Reliability Results for the Overall Instrument and Respective Subscales.

| Instrument Subscale | N | Mean | Standard Deviation | Cronbach's Alpha Reliability Coefficient |
|---|---|---|---|---|
| Production Agriculture | | | | |
| Eighth Grade Students | 541 | 72.1 | 19.3 | .9340 |
| Tenth Grade Students | 182 | 85.8 | 14.3 | .9060 |
| Total | 724 | 75.6 | 19.1 | .9343 |
| Agricultural Mechanics | | | | |
| Eighth Grade Students | 576 | 32.9 | 10.8 | .9062 |
| Tenth Grade Students | 181 | 40.3 | 8.9 | .9050 |
| Total | 758 | 34.6 | 10.8 | .9138 |
| Horticulture | | | | |
| Eighth Grade Students | 574 | 39.9 | 11.96 | .9098 |
| Tenth Grade Students | 185 | 47.7 | 9.97 | .9035 |
| Total | 760 | 41.8 | 11.98 | .9129 |
| Agricultural Products, Processing and Marketing | | | | |
| Eighth Grade Students | 558 | 45.2 | 10.5 | .8362 |
| Tenth Grade Students | 178 | 52.5 | 8.1 | .7983 |
| Total | 737 | 46.9 | 10.5 | .8395 |
| Agricultural Supplies and Services | | | | |
| Eighth Grade Students | 575 | 42.3 | 9.3 | .8425 |
| Tenth Grade Students | 186 | 46.8 | 7.7 | .8190 |
| Total | 762 | 43.4 | 9.2 | .8379 |
| Renewable Natural Resources | | | | |
| Eighth Grade Students | 567 | 42.9 | 13.4 | .9423 |
| Tenth Grade Students | 179 | 52.1 | 10.1 | .9160 |
| Total | 747 | 45.1 | 13.3 | .9422 |
| Forestry | | | | |
| Eighth Grade Students | 587 | 19.6 | 5.98 | .8001 |
| Tenth Grade Students | 186 | 23.8 | 4.6 | .6660 |
| Total | 744 | 20.7 | 5.9 | .7947 |
| Total Instrument | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | .9766 |
| Tenth Grade Students | 195 | 349.4 | 49.4 | .9616 |
| Total | 814 | 312.7 | 67.9 | .9765 |

Table 3 Comparison for Male and Female Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | Female N | Female X | Female S.D. | Male N | Male X | Male S.D. |
|---|---|---|---|---|---|---|
| Production Agriculture | | | | | | |
| Eighth Grade Students | 283 | 72.0 | 17.0 | 254 | 72.1 | 21.6 |
| Tenth Grade Students | 70 | 86.9 | 12.6 | 110 | 85.4 | 15.2 |
| Total | 353 | 74.9 | 17.3 | 365 | 76.2 | 20.8 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 299 | 28.7 | 8.5 | 272 | 37.4 | 11.3 |
| Tenth Grade Students | 71 | 35.6 | 8.3 | 108 | 43.5 | 7.9 |
| Total | 370 | 30.1 | 8.9 | 381 | 39.1 | 10.8 |
| Horticulture | | | | | | |
| Eighth Grade Students | 300 | 42.9 | 11.1 | 270 | 36.5 | 12.1 |
| Tenth Grade Students | 69 | 52.2 | 9.2 | 115 | 45.1 | 9.5 |
| Total | 369 | 44.6 | 11.3 | 386 | 39.1 | 12.0 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 290 | 47.1 | 9.6 | 263 | 43.1 | 11.2 |
| Tenth Grade Students | 69 | 55.4 | 6.9 | 107 | 50.9 | 8.4 |
| Total | 359 | 48.7 | 9.7 | 371 | 45.2 | 11.0 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 300 | 44.4 | 8.3 | 270 | 40.0 | 9.9 |
| Tenth Grade Students | 71 | 50.0 | 6.3 | 112 | 44.9 | 8.0 |
| Total | 371 | 45.5 | 8.2 | 383 | 41.4 | 9.7 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 294 | 42.3 | 12.6 | 269 | 43.5 | 14.3 |
| Tenth Grade Students | 68 | 52.3 | 8.9 | 109 | 52.3 | 10.6 |
| Total | 362 | 44.2 | 12.6 | 379 | 44.2 | 12.6 |
| Forestry | | | | | | |
| Eighth Grade Students | 304 | 17.9 | 5.1 | 277 | 21.5 | 6.4 |
| Tenth Grade Students | 71 | 21.9 | 4.2 | 112 | 25.2 | 4.3 |
| Total | 375 | 18.7 | 5.2 | 390 | 22.6 | 6.1 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 4 Comparison for Rural and Urban Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | Rural N | Rural X | Rural S.D. | Urban N | Urban X | Urban S.D. |
|---|---|---|---|---|---|---|
| Production Agriculture | | | | | | |
| Eighth Grade Students | 204 | 78.0 | 18.7 | 327 | 68.5 | 18.9 |
| Tenth Grade Students | 61 | 89.5 | 13.2 | 117 | 84.2 | 14.6 |
| Total | 266 | 80.7 | 18.2 | 444 | 72.6 | 19.2 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 212 | 35.4 | 10.7 | 353 | 31.4 | 10.7 |
| Tenth Grade Students | 55 | 42.3 | 8.8 | 122 | 39.6 | 8.9 |
| Total | 268 | 36.8 | 10.7 | 475 | 33.5 | 10.8 |
| Horticulture | | | | | | |
| Eighth Grade Students | 210 | 41.8 | 11.5 | 353 | 38.7 | 12.1 |
| Tenth Grade Students | 60 | 45.6 | 8.9 | 122 | 48.7 | 10.3 |
| Total | 271 | 42.6 | 11.1 | 475 | 41.3 | 12.5 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 206 | 46.8 | 10.7 | 341 | 44.3 | 10.4 |
| Tenth Grade Students | 59 | 49.2 | 8.9 | 117 | 54.2 | 7.1 |
| Total | 266 | 47.3 | 10.4 | 458 | 46.8 | 10.6 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 217 | 43.1 | 9.2 | 347 | 42.0 | 9.2 |
| Tenth Grade Students | 61 | 44.4 | 8.2 | 121 | 48.0 | 7.2 |
| Total | 279 | 43.3 | 9.0 | 486 | 43.5 | 9.3 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 212 | 45.9 | 13.2 | 345 | 41.0 | 13.4 |
| Tenth Grade Students | 55 | 51.9 | 9.3 | 121 | 52.5 | 10.3 |
| Total | 268 | 47.1 | 12.7 | 466 | 44.0 | 13.6 |
| Forestry | | | | | | |
| Eighth Grade Students | 218 | 21.3 | 6.0 | 358 | 18.7 | 6.0 |
| Tenth Grade Students | 61 | 25.6 | 4.1 | 121 | 23.1 | 4.6 |
| Total | 280 | 22.2 | 5.9 | 479 | 19.8 | 5.8 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 5 Comparison for Enrolling and Non Enrolling Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | Enrolling N | X | S.D. | Non Enrolling N | X | S.D. |
|---|---|---|---|---|---|---|
| Production Agriculture | | | | | | |
| Eighth Grade Students | 63 | 88.6 | 18.4 | 466 | 69.7 | 18.3 |
| Tenth Grade Students | 156 | 86.8 | 14.1 | 20 | 81.4 | 13.0 |
| Total | 220 | 87.4 | 15.4 | 486 | 70.2 | 18.3 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 68 | 39.4 | 10.7 | 494 | 31.9 | 10.5 |
| Tenth Grade Students | 155 | 40.9 | 8.8 | 21 | 37.1 | 8.7 |
| Total | 224 | 40.4 | 9.4 | 515 | 32.1 | 10.5 |
| Horticulture | | | | | | |
| Eighth Grade Students | 70 | 47.9 | 11.8 | 492 | 38.7 | 11.6 |
| Tenth Grade Students | 157 | 48.5 | 9.9 | 23 | 43.3 | 9.6 |
| Total | 228 | 48.2 | 10.5 | 515 | 38.9 | 11.6 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 65 | 51.5 | 11.4 | 482 | 44.3 | 10.1 |
| Tenth Grade Students | 150 | 52.9 | 8.2 | 23 | 49.2 | 7.2 |
| Total | 216 | 52.4 | 9.3 | 505 | 44.6 | 10.1 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 66 | 45.7 | 11.1 | 496 | 41.9 | 9.0 |
| Tenth Grade Students | 158 | 47.2 | 7.7 | 21 | 44.5 | 7.5 |
| Total | 225 | 46.7 | 8.9 | 517 | 42.0 | 9.0 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 65 | 52.5 | 13.8 | 489 | 41.6 | 13.0 |
| Tenth Grade Students | 152 | 52.6 | 9.8 | 21 | 51.1 | 11.6 |
| Total | 218 | 52.5 | 11.1 | 510 | 42.0 | 13.0 |
| Forestry | | | | | | |
| Eighth Grade Students | 68 | 24.3 | 5.4 | 506 | 19.0 | 5.8 |
| Tenth Grade Students | 159 | 24.0 | 4.7 | 21 | 22.7 | 3.8 |
| Total | 228 | 24.1 | 4.9 | 527 | 19.1 | 5.7 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 6 Comparison for Farm and Non Farm Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | Farm | | | Non Farm | | |
|---|---|---|---|---|---|---|
| | N | X | S.D. | N | X | S.D. |
| Production Agriculture | | | | | | |
| Eighth Grade Students | 91 | 79.5 | 19.6 | 434 | 70.5 | 19.1 |
| Tenth Grade Students | 49 | 89.4 | 14.6 | 128 | 85.3 | 13.5 |
| Total | 141 | 83.1 | 18.6 | 562 | 73.9 | 19.0 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 101 | 36.5 | 10.6 | 458 | 32.2 | 10.7 |
| Tenth Grade Students | 46 | 43.1 | 8.8 | 130 | 39.6 | 8.7 |
| Total | 148 | 38.6 | 10.5 | 588 | 33.8 | 10.8 |
| Horticulture | | | | | | |
| Eighth Grade Students | 99 | 41.0 | 11.4 | 458 | 40.0 | 12.1 |
| Tenth Grade Students | 48 | 47.5 | 9.9 | 133 | 47.9 | 10.0 |
| Total | 148 | 43.1 | 11.3 | 591 | 41.5 | 12.2 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 94 | 46.7 | 10.4 | 447 | 44.8 | 10.6 |
| Tenth Grade Students | 49 | 52.0 | 9.4 | 126 | 52.8 | 7.6 |
| Total | 144 | 48.4 | 10.4 | 573 | 46.5 | 10.6 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 99 | 43.0 | 9.8 | 460 | 42.2 | 9.3 |
| Tenth Grade Students | 49 | 46.3 | 8.2 | 132 | 47.1 | 7.5 |
| Total | 149 | 44.0 | 9.6 | 592 | 43.3 | 9.1 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 92 | 44.3 | 13.2 | 461 | 42.6 | 13.6 |
| Tenth Grade Students | 43 | 52.6 | 10.4 | 131 | 52.4 | 9.9 |
| Total | 136 | 46.9 | 12.9 | 592 | 44.8 | 13.5 |
| Forestry | | | | | | |
| Eighth Grade Students | 101 | 22.1 | 5.9 | 470 | 19.2 | 5.9 |
| Tenth Grade Students | 49 | 25.6 | 4.1 | 133 | 23.3 | 4.6 |
| Total | 151 | 23.3 | 5.6 | 603 | 20.1 | 5.9 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 7 Comparison for Future College Education and No Future College Education Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | Future College N | X | S.D. | No Future College N | X | S.D. |
|---|---|---|---|---|---|---|
| Production Agriculture | | | | | | |
| Eighth Grade Students | 393 | 72.7 | 19.2 | 120 | 70.1 | 20.2 |
| Tenth Grade Students | 119 | 86.3 | 13.7 | 54 | 86.5 | 20.2 |
| Total | 512 | 75.8 | 19.0 | 175 | 75.3 | 20.3 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 412 | 32.0 | 10.6 | 130 | 35.8 | 11.0 |
| Tenth Grade Students | 120 | 39.9 | 9.2 | 52 | 41.5 | 8.2 |
| Total | 523 | 33.8 | 10.8 | 183 | 37.4 | 10.5 |
| Horticulture | | | | | | |
| Eighth Grade Students | 412 | 41.2 | 11.5 | 129 | 36.6 | 12.8 |
| Tenth Grade Students | 123 | 49.3 | 9.8 | 54 | 44.3 | 9.7 |
| Total | 535 | 43.0 | 11.7 | 184 | 38.8 | 12.4 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 401 | 46.5 | 10.3 | 125 | 42.0 | 10.7 |
| Tenth Grade Students | 115 | 54.7 | 6.7 | 56 | 48.6 | 8.8 |
| Total | 516 | 48.3 | 10.2 | 182 | 44.0 | 10.6 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 415 | 43.9 | 9.0 | 130 | 38.1 | 9.3 |
| Tenth Grade Students | 123 | 49.2 | 6.4 | 54 | 42.8 | 8.0 |
| Total | 538 | 45.1 | 8.7 | 185 | 39.4 | 9.2 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 409 | 43.7 | 13.4 | 125 | 40.7 | 13.9 |
| Tenth Grade Students | 120 | 53.4 | 9.6 | 51 | 50.1 | 10.5 |
| Total | 529 | 45.9 | 13.3 | 177 | 43.4 | 13.6 |
| Forestry | | | | | | |
| Eighth Grade Students | 422 | 19.2 | 5.9 | 132 | 21.1 | 6.1 |
| Tenth Grade Students | 126 | 23.4 | 4.6 | 54 | 24.9 | 4.2 |
| Total | 548 | 20.2 | 5.9 | 187 | 22.2 | 5.8 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 8 Comparison for Academic Performance in Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | A's B's &C's N | X | S.D. | D's & F's N | X | S.D. |
|---|---|---|---|---|---|---|
| Production Agriculture | | | | | | |
| Eighth Grade Students | 423 | 72.8 | 19.1 | 98 | 68.8 | 20.7 |
| Tenth Grade Students | 134 | 87.6 | 13.8 | 41 | 80.7 | 15.0 |
| Total | 558 | 76.4 | 19.0 | 139 | 72.3 | 19.9 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 441 | 32.7 | 10.6 | 111 | 33.6 | 11.6 |
| Tenth Grade Students | 133 | 40.5 | 9.1 | 41 | 39.5 | 8.5 |
| Total | 575 | 34.5 | 10.8 | 152 | 35.2 | 11.2 |
| Horticulture | | | | | | |
| Eighth Grade Students | 446 | 40.7 | 11.7 | 103 | 36.7 | 12.9 |
| Tenth Grade Students | 139 | 48.9 | 9.8 | 41 | 44.1 | 9.5 |
| Total | 586 | 42.6 | 11.8 | 144 | 38.8 | 12.5 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 430 | 45.9 | 10.1 | 105 | 42.7 | 12.1 |
| Tenth Grade Students | 131 | 53.2 | 7.9 | 40 | 49.9 | 8.6 |
| Total | 562 | 47.6 | 10.1 | 145 | 44.7 | 11.7 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 449 | 43.3 | 8.8 | 103 | 38.5 | 10.6 |
| Tenth Grade Students | 138 | 47.7 | 7.6 | 41 | 44.1 | 7.8 |
| Total | 588 | 44.3 | 8.7 | 144 | 40.1 | 10.2 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 442 | 43.8 | 13.4 | 102 | 39.3 | 13.3 |
| Tenth Grade Students | 132 | 53.2 | 10.1 | 40 | 49.2 | 9.2 |
| Total | 575 | 46.0 | 13.3 | 142 | 42.1 | 13.0 |
| Forestry | | | | | | |
| Eighth Grade Students | 451 | 19.7 | 6.0 | 111 | 19.3 | 5.8 |
| Tenth Grade Students | 137 | 24.2 | 4.7 | 42 | 22.9 | 4.1 |
| Total | 589 | 20.7 | 6.0 | 153 | 20.3 | 5.6 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 9 Comparison for Socio-Economic Status of Eighth and Tenth Grade Students on the Subscales and the Overall Revised Applied Biological and Agribusiness Interest Inventory.

| Instrument Subscale and Grade | Father Professional/Business N | X | S.D. | Father Craftsman/Laborer N | X | S.D. |
|---|---|---|---|---|---|---|
| Production Agriculture | | | | | | |
| Eighth Grade Students | 127 | 70.1 | 19.7 | 175 | 75.3 | 18.4 |
| Tenth Grade Students | 40 | 87.9 | 14.2 | 64 | 87.5 | 14.0 |
| Total | 167 | 74.4 | 20.0 | 239 | 78.5 | 18.1 |
| Agricultural Mechanics | | | | | | |
| Eighth Grade Students | 139 | 30.8 | 10.9 | 188 | 34.1 | 10.6 |
| Tenth Grade Students | 38 | 41.7 | 8.9 | 68 | 40.7 | 8.8 |
| Total | 177 | 33.1 | 11.4 | 256 | 35.9 | 10.5 |
| Horticulture | | | | | | |
| Eighth Grade Students | 134 | 40.0 | 12.1 | 190 | 41.2 | 11.4 |
| Tenth Grade Students | 42 | 48.9 | 8.7 | 64 | 47.8 | 8.6 |
| Total | 176 | 42.1 | 12.0 | 254 | 42.9 | 11.1 |
| Agricultural Products, Processing and Marketing | | | | | | |
| Eighth Grade Students | 132 | 44.5 | 10.9 | 186 | 46.0 | 9.9 |
| Tenth Grade Students | 41 | 52.8 | 8.2 | 62 | 51.9 | 8.3 |
| Total | 173 | 46.5 | 10.9 | 248 | 47.5 | 9.8 |
| Agricultural Supplies and Services | | | | | | |
| Eighth Grade Students | 139 | 42.4 | 9.4 | 188 | 42.8 | 9.1 |
| Tenth Grade Students | 43 | 47.6 | 7.9 | 65 | 45.6 | 7.4 |
| Total | 182 | 43.6 | 9.3 | 253 | 43.5 | 8.8 |
| Renewable Natural Resources | | | | | | |
| Eighth Grade Students | 139 | 42.2 | 13.8 | 182 | 44.9 | 12.1 |
| Tenth Grade Students | 38 | 52.5 | 9.7 | 65 | 53.5 | 9.1 |
| Total | 177 | 44.4 | 13.7 | 247 | 47.1 | 12.0 |
| Forestry | | | | | | |
| Eighth Grade Students | 142 | 18.8 | 5.9 | 188 | 20.5 | 5.9 |
| Tenth Grade Students | 42 | 24.5 | 4.5 | 66 | 24.7 | 4.2 |
| Total | 184 | 20.1 | 6.1 | 254 | 21.6 | 5.8 |
| Total Instrument | | | | | | |
| Eighth Grade Students | 618 | 300.6 | 68.9 | | | |
| Tenth Grade Students | 195 | 349.4 | 49.4 | | | |
| Total | 814 | 312.7 | 67.9 | | | |

Table 10. Scales Based on Tenth Grade Student Interests in Agriculture Classified as Low, Moderate or High.

| | X | S.D. | Range | | X + 1 S.D. | | |
|---|---|---|---|---|---|---|---|
| | | | Low | High | Low Interest | Med. Interest | High Interest |
| Total Instrument | 349 | 49 | 228 | 479 | <300 | 300-398 | >398 |
| Production Agriculture | 86 | 14 | 47 | 119 | <72 | 72-100 | >100 |
| Agricultural Mechanics | 40 | 9 | 20 | 60 | <31 | 31-49 | >49 |
| Horticulture | 48 | 10 | 25 | 68 | <48 | 48-58 | >58 |
| Agricultural Products Processing and Marketing | 53 | 8 | 28 | 71 | <45 | 45-61 | >61 |
| Agricultural Supplies and Services | 47 | 8 | 18 | 62 | <39 | 39-55 | >55 |
| Renewable Natural Resources | 52 | 10 | 25 | 75 | <42 | 42-62 | >62 |
| Forestry | 24 | 5 | 9 | 35 | <19 | 19-29 | >29 |

Table 11. Distribution of Tenth and Eighth Grade Student Interests in Agriculture Classified as Low, Moderate or High.

| Agricultural Interest Scale | Range Low | Range High | Interest Level* Low Ag. Interest | Interest Level* Med. Ag. Interest | Interest Level* High Ag. Interest |
|---|---|---|---|---|---|
| Production Agriculture Scale | | | <72 | 72-100 | >100 |
| 10th Grade | 47 | 119 | 15% | 69% | 16% |
| 8th Grade | 24 | 119 | 49% | 45% | 6% |
| Agricultural Mechanics Scale | | | <31 | 31-49 | >49 |
| 10th Grade | 20 | 60 | 18% | 68% | 14% |
| 8th Grade | 12 | 59 | 44% | 49% | 7% |
| Horticulture Scale | | | <48 | 48-58 | >58 |
| 10th Grade | 25 | 68 | 49% | 36% | 15% |
| 8th Grade | 14 | 70 | 72% | 22% | 6% |
| Agricultural Products Processing and Marketing Scale | | | <45 | 45-61 | >61 |
| 10th Grade | 28 | 71 | 15% | 72% | 13% |
| 8th Grade | 15 | 74 | 45% | 50% | 5% |
| Agricultural Supplies and Services Scale | | | <39 | 39-55 | >55 |
| 10th Grade | 18 | 62 | 13% | 75% | 12% |
| 8th Grade | 13 | 65 | 31% | 63% | 6% |
| Renewable Natural Resources Scale | | | <42 | 42-62 | >62 |
| 10th Grade | 25 | 75 | 16% | 67% | 17% |
| 8th Grade | 15 | 75 | 43% | 51% | 6% |
| Forestry Scale | | | <19 | 19-29 | >29 |
| 10th Grade | 9 | 35 | 15% | 74% | 11% |
| 8th Grade | 7 | 35 | 41% | 54% | 5% |
| Total Instrument Scale | 228 | 479 | <300 | 300-398 | >398 |

* Cut off values for agricultural interest were established using the criterion group (10th graders) information presented in Table 10.

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# APPENDIX A

## QUESTIONNAIRE

# The Revised Applied Biological and Agribusiness Interest Inventory

**The Revised Applied Biological and Agribusiness Interest Inventory**

Instructions

You are about to take a test to help discover something about your interests. This is not a test of ability. It is concerned only with your expression of like or dislike for each of 100 activities.

Read each statement carefully, and tell how you feel about the activity that it describes. On the separate answer sheet, blacken out the one symbol that best represents your like or dislike for the item. The symbols have the following meanings:

| Strongly Like | Like | Undecided | Dislike | Strongly Dislike |
|---|---|---|---|---|
| A | B | C | D | E |

Here are some examples similar to those found in the test:

| | | | | | |
|---|---|---|---|---|---|
| 1. Drive a car | ■ | B | C | D | E |
| 2. Operate a computer | A | B | C | ■ | E |
| 3. Walk a dog | A | B | ■ | D | E |

A person who marks the first item, "Drive a car," by blackening out the symbol "A" means that he/she strongly likes the activity. The marking of "D" for the second item, "Operate a computer," tells that the person believes he/she would dislike such work. The person who marks "C" for the third item, "Walk a dog," show that he/she is undecided in his/her feeling.

Read each of the following statements carefully. After reading each statement, use the scale below to rate your feelings toward the statement. If you choose an "A" it means that you strongly like or would like to do what the statement says, a "C" means that you are undecided, and "E" means that you strongly dislike what the statement says. You can use any letter on the scale. For each statement, code your letter onto the computer scan sheet that is provided. Please only select one letter for each statement. Be sure to blacken out one symbol on the answer sheet for each item. **Please do <u>not</u> write on this form.**

| Strongly Like | Like | Undecided | Dislike | Strongly Dislike |
|---|---|---|---|---|
| A | B | C | D | E |

1. Look at livestock at a fair
2. Visit the zoo
3. Replace a broken window
4. Manage an area for wildlife
5. Cut logs into usable products
6. Cut up meat
7. Build a birdhouse
8. Learn how to conserve energy use
9. Change a sparkplug
10. Trim a hedge
11. Things that challenge you
12. Grow plants in water
13. Design displays or exhibits about agriculture
14. Work in a greenhouse
15. Watch a baby chick hatch from an egg
16. Learn about indoor tanks for raising fish
17. Learn about soil conservation
18. Learn about the environment
19. Talk with people
20. Restore polluted streams and rivers
21. Travel to another country
22. Determine the value of a forest
23. Protect lakes, streams and rivers from pollution
24. New and different experiences
25. Solve other peoples problems

| Strongly Like | Like | Undecided | Dislike | Strongly Dislike |
|---|---|---|---|---|
| A | B | C | D | E |

26. Water plants
27. Draw plans for a building
28. Smell new cut hay
29. Learn how to make ice cream
30. Understand animal growth hormone effects
31. Manage fisheries, including streams, lakes and reservoirs
32. Build things from wood
33. Follow international events
34. Change a fuse
35. Develop a landscape plan with a computer
36. Operate farm equipment
37. Harvest fish
38. Repair something broken
39. Change a bicycle tire
40. Watch honeybees at work
41. Solve practical problems using math
42. Grow flowers
43. Raise small animals
44. Work with plants and trees
45. Study plant/animal cell structure
46. Help repair a lawn-mower engine
47. Arrange flowers
48. Wire an electrical plug
49. Measure fish growth
50. Milk cows

| Strongly Like | Like | Undecided | Dislike | Strongly Dislike |
|---|---|---|---|---|
| A | B | C | D | E |

51. Attend a livestock sale
52. Grow plants from tissue cultures
53. Plant a tree
54. Learn about natural resources (land, water, air)?
55. Work in a flower shop
56. Prepare soil for planting a crop
57. Eat different types of food (Chinese, Japanese, etc.)
58. Use a microscope
59. Learn about groundwater pollution
60. Learn about people in far away places
61. Drive a bulk feed or fertilizer truck
62. Working with the general public
63. Listen to people
64. Working with your hands
65. Become involved in environmental decision-making
66. Grow plants in a greenhouse
67. Identify wildlife species of birds, mammals and reptiles
68. Speak another language
69. Take pictures of agricultural items
70. Name the trees in the woods
71. Interested in science
72. Care for animals
73. Help protect our environment
74. Study what makes animals and plants grow
75. Operate heavy equipment such as trucks and bulldozers

| Strongly Like | Like | Undecided | Dislike | Strongly Dislike |
|---|---|---|---|---|
| A | B | C | D | E |

76. Work outdoors in all types of weather
77. Read the National Geographic Magazine
78. Be president of the FFA
79. Interested in how animals grow
80. Care for sick animals
81. Sell lawn and garden equipment
82. Work with hand tools
83. Raise fish for restocking fisheries
84. Learn more about acid rain
85. Working by yourself
86. Live on a farm
87. Brush an animal
88. Raise an animal
89. Identify fish
90. Cook different types of food
91. Mow a lawn
92. Visit a farm
93. Conduct taste tests on new food products
94. Prevent soil erosion
95. Check oil in an engine
96. Take things apart and put them back together
97. Study ponds and lakes
98. Explore alternate solutions to problems
99. Grow a vegetable garden
100. Grow indoor plants